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ABSTRACT

Compared was the performance of 17 preschool and 10 early elementary educable mentally retarded (EMR) children with the performance of 50 normal prescnool children on a developmental sequence of tasks in visual perception. Tested were the skills of recognition, discrimination, recall, and reconstruction of common objects, size concepts, shape concepts, color concepts, and combinations of dimensions. A developmental prpgression from simple recognition through reconstruction was observed in both normal and EMR children, though younger EMR children performed better on the representational tasks than on the concrete tasks. Implication for the training of young EMR children included the presentation of tasks in steps from recognition to reconstruction, the designing of tasks to minimize the effects of poor motor coordination, the provision of practice with both concrete and representational materials, and the use of a game format to increase motivation. (See EC 052 240 for a related document). (DB)

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VISUAL PERCEPTION TASK SEQUENCE: A COMPARISON OF THE PERFORMANCE OF YOUNG NORMAL AND RETARDED CHILDREN

by

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Abstract: A developmental sequence of tasks in visual perception was previously validated with a sample of 50 normal preschool children. This paper presents a comparison study of the performance of normal subjects with that of preschool and primary level EMR children.

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EC 052 229

VISUAL PERCEPTION TASK SEQUENCE: A COMPARISON OF THE PERFORMANCE OF YOUNG NORMAL AND RETARDED CHILDREN

The structure of a model for sequencing visual perception tasks was validated at the concrete and representational levels in an earlier study (Langstaff and Volkmor, 1971). The subjects in the validation study were 50 normal preschool children. This paper reports on a comparison study to determine the similarities and differences between the performance of these normal children and that of young EMR children on the visual perception task sequence.

SPECIFIC OBJECTIVES:

1.0 To determine:

- 1.1 whether retarded learners show a developmental progression similar to that of normal children on concrete and representational level tasks.
- 1.2 whether the finding with normal children that representational level tasks are more difficult than the concrete level tasks holds for retarded learners.
- 1.3 whether the order of dimension difficulty (multidimensional, size, shape, color) is the same for retarded subjects as for normals.
- 1.4 whether the sequential difficulty of the steps in skill attainment found for normal children is followed by retardates.

2.0 To state suggestions for the training of retarded children in visual perception tasks, based on the findings of this study.

SUBJECTS:

17 preschool students from Exceptional Children's Foundation programs in Los Angeles were identified by their teachers as children who would probably be placed in EMR programs when they entered public school. These students ranged in age from 4:4 to 5:10. Ten primary EMR students, ranging in age from 7:2 to 9:11 years, from a public school classroom in Orange County also participated in the study.

METHOD:

The visual perception test sequence (concrete and reprentational tasks) for the EMR subjects was identical to that used with the normal children (Langstaff and Volkmor, 1971). Scoring criteria were also the same.

ANALYSIS OF DATA:

Frequency counts for each test item were made for both groups of EMR students. Percentages of students passing the items were computed so that the data could more easily be compared with that for the normal sample. This procedure permitted the determination of:

1. Age progression in terms of total test scores.
2. The difficulty of representational level items as compared to concrete level items.
3. The progressive difficulty of items involving the dimensions of common objects, size, shape, and color.

Since the earlier analysis of data (normal sample) revealed that most of the shape items at the concrete level and the majority of the size items at the representational level were too easy, a meaningful comparison of all the objects, size, shape and color items was impossible. Thus the best or most discriminating item for each dimension in both levels was selected for the analysis of dimension difficulty. This approach was therefore used in the analysis of data for the retarded subjects.

The order of difficulty of steps in skill attainment was determined (for both the normal and retarded groups) by adding the total scores obtained by all subjects for: (a) recognition, (b) discrimination, (c) recall, and (d) reconstruction.

Finally, an informal task analysis was made to determine if there was a pattern in the type of items which differentiated EMR children from normal subjects whose overall performance patterns were comparable.

RESULTS:

1.0 Table 1 presents the comparative numbers (by age) of normal and EMR subjects passing each item on the test.

TABLE 1.

Frequency Counts of Number of Normal and EMR Subjects Passing Each Test Item

Visual Perception Test Items	Age Group							
	Normal					EMR		
	3:0-3:5	3:6-3:9	4:0-4:5	4:6-4:9	5:0-5:5	4-4:11	5-5:10	7-9:11
	n=10 in each group					n=6	n=11	n=10
CONCRETE LEVEL								
COMMON OBJECTS								
1. Recognition	9	10	10	10	10	6	11	10
*2. Discrimination	2	6	7	8	6	0	2	7
*3. Recall	5	7	10	8	10	6	10	9
*4. Reconstruction	3	6	9	10	10	2	3	10
5. Reconstruction	2	2	1	4	5	1	5	4
SIZE								
6. Recognition	9	10	10	10	10	4	6	8
*7. Discrimination	3	7	10	9	9	1	6	8
8. Recall	5	6	5	5	8	4	9	9
*9. Reconstruction	5	5	7	8	9	1	2	9
SHAPE								
*10. Recognition	5	6	9	10	10	5	10	10
11. Discrimination	10	9	10	10	10	6	11	10
12. Recall	8	9	10	8	10	5	11	10
13. Reconstruction	10	10	10	10	10	6	11	10
COLOR								
*14. Recognition	6	8	9	10	10	4	8	10
*15. Recognition	6	7	8	10	10	3	8	10
16. Discrimination	7	10	10	9	10	5	8	9
*17. Recall & Reconstruction	0	2	1	8	6	0	4	3
COMBINATION OF DIMENSIONS								
*18. Shape & size varied, color constant	1	3	3	5	5	0	2	4
*19. Shape & size varied, color constant	0	1	3	4	8	0	0	2
*20. Shape & size varied, color constant	0	2	4	7	9	0	3	4
*21. Shape & color varied, size constant	4	6	9	9	10	6	10	10
*22. Shape & color varied, size constant	4	6	5	8	10	2	7	10
*23. Size, shape & color varied	7	5	8	8	9	2	4	10
*24. Size, shape & color varied	1	3	7	8	10	1	3	10
25. Size, shape & color varied	1	1	2	2	4	3	4	4

*Items which discriminated across age levels in normal sample

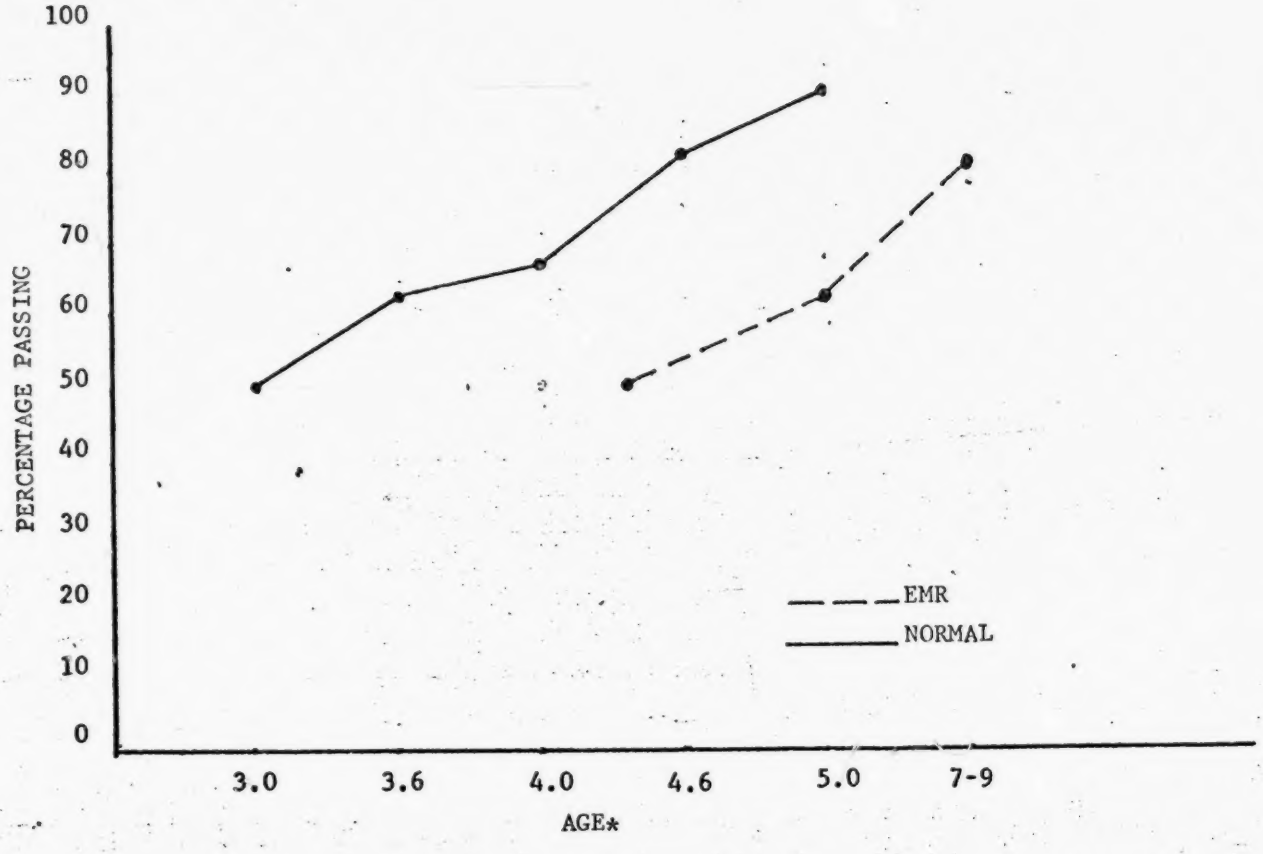
Visual Perception Test Items (cont'd)	Age Group: Normal					EMR		
	3:0-3:5	3:6-3:9	4:0-4:5	4:6-4:9	5:0-5:5	4-4:11	5-5:10	7-9:11
	n=10 in each group					n=5	n=9	n=10 **
REPRESENTATIONAL LEVEL								
COMMON OBJECTS								
*26. Recognition	5	7	8	7	9	4	9	10
27. Discrimination	8	10	10	10	10	4	9	10
*28. Recall & Reconstruction	0	2	3	7	4	2	2	6
*29. Reconstruction	4	1	2	6	8	1	2	6
SIZE								
30. Recognition	10	10	10	10	10	5	9	9
31. Discrimination	9	9	9	10	10	3	6	8
32. Recall	[illegible]	8	5	10	9	2	9	8
*33. Reconstruction	4	5	8	7	9	2	6	9
SHAPE								
34. Recognition	6	5	6	10	9	4	8	9
*35. Discrimination	4	5	[illegible]	8	9	4	3	10
36. Recall	7	8	9	9	10	4	8	9
37. Reconstruction	4	4	5	8	7	1	4	6
*38. Reconstruction	0	1	3	7	7	2	6	8
COLOR								
*39. Recognition	5	7	9	9	10	3	7	10
*40. Discrimination	3	8	9	10	10	5	7	10
*41. Recall	5	7	9	9	10	2	6	4
*42. Reconstruction	0	1	3	7	7	0	1	6
COMBINATION OF DIMENSIONS								
43. Size, shape & color varied	6	9	8	8	8	3	8	8
44. Size, shape & color varied	3	4	8	3	3	1	5	5
45. Size, shape & color varied	7	7	7	10	9	3	7	8
*46. Size, shape & color varied	3	6	7	10	9	1	5	6
*47. Size, shape & color varied	2	6	7	9	10	2	6	8

*Items which discriminated across age levels in normal sample.

** Data were incomplete for 3 EMR subjects, thus N's are reduced.

1.1 The age distributions of the percentage of normal and EMR children passing the entire test are shown in Figure 1. The data show that the performance of EMR children is comparable to that of normal children who are approximately 1½ - 2½ years younger. There is clearly a developmental progression in the visual perceptual abilities measured for the EMR as well as for the normal children. The tasks became progressively easier with age increase for both groups of children.

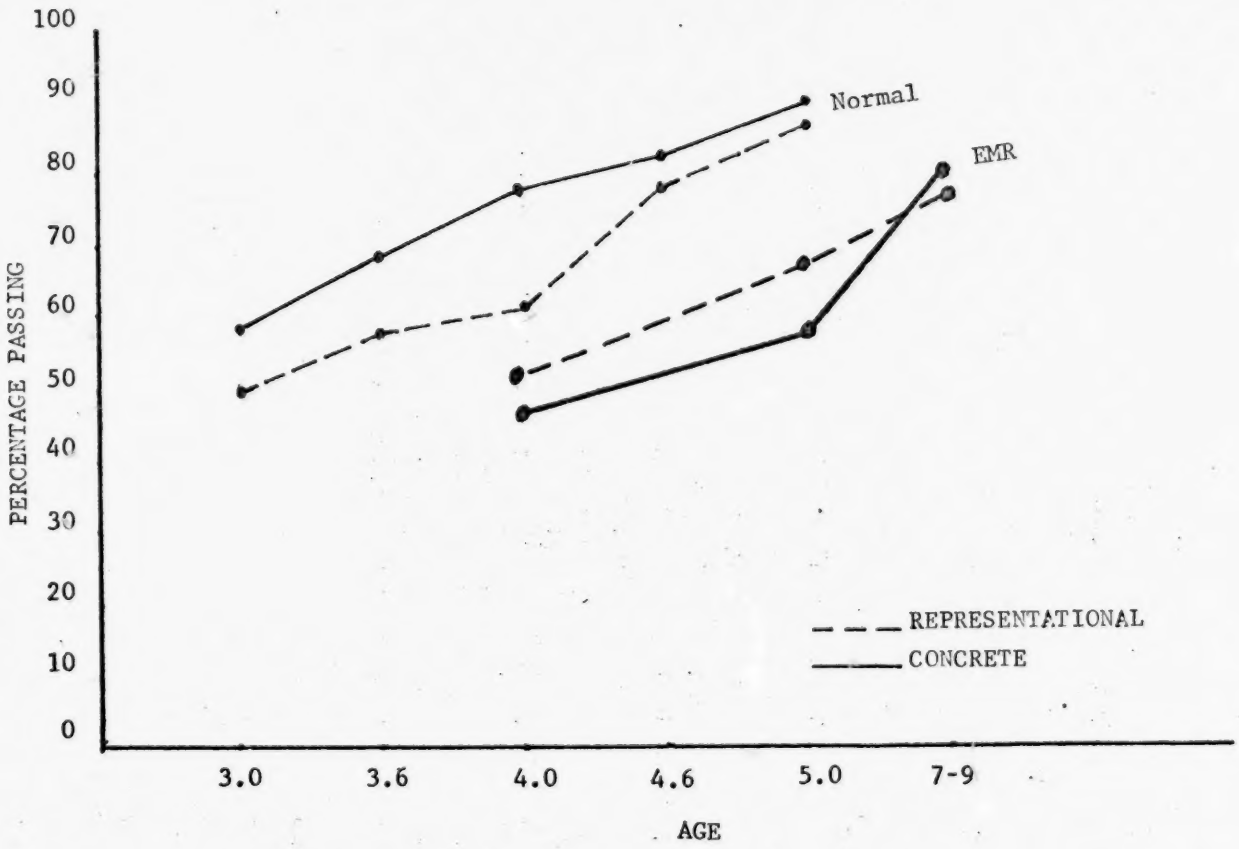
FIGURE 1--Percentages by Age of Normal and EMR Subjects Passing the Entire Test.



*See Table 1 for age distribution of subjects in both groups.

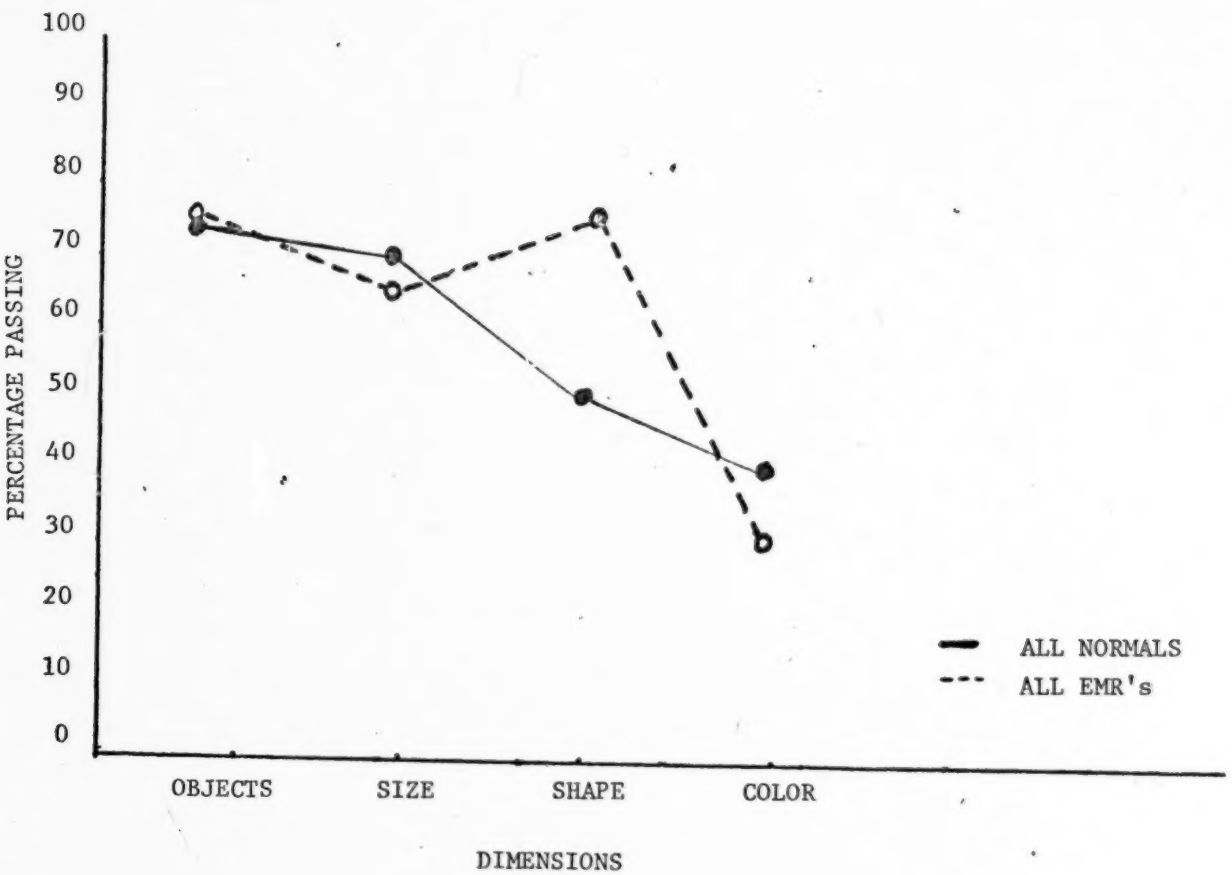
1.2 Performance on the concrete level tasks was compared with performance on the representational level tasks for each age group of retarded subjects and compared by age with the performance of the normal children (See Figure 2). The data for the younger EMR's suggest that the representational level tasks were less difficult than the concrete level tasks, thus the findings were not in the predicted direction. For the 7-9 year old primary EMR's, the results are consistent with the findings for normal pre-schoolers; specifically that representational level tasks are more difficult than the concrete level tasks.

FIGURE 2--Comparison of Performance of Normal and EMR Subjects on Concrete vs. Representational Level Tasks



1.3 The order of dimension difficulty was also different for the EMR children than it was for the normal subjects (see Figure 3). Tasks relating to perception of shape were easier than those dealing with perception of common objects, size or color. This pattern was consistent for all age levels of EMR children tested but was more marked for the 4 year olds, and less extreme for the 7-9 year olds.

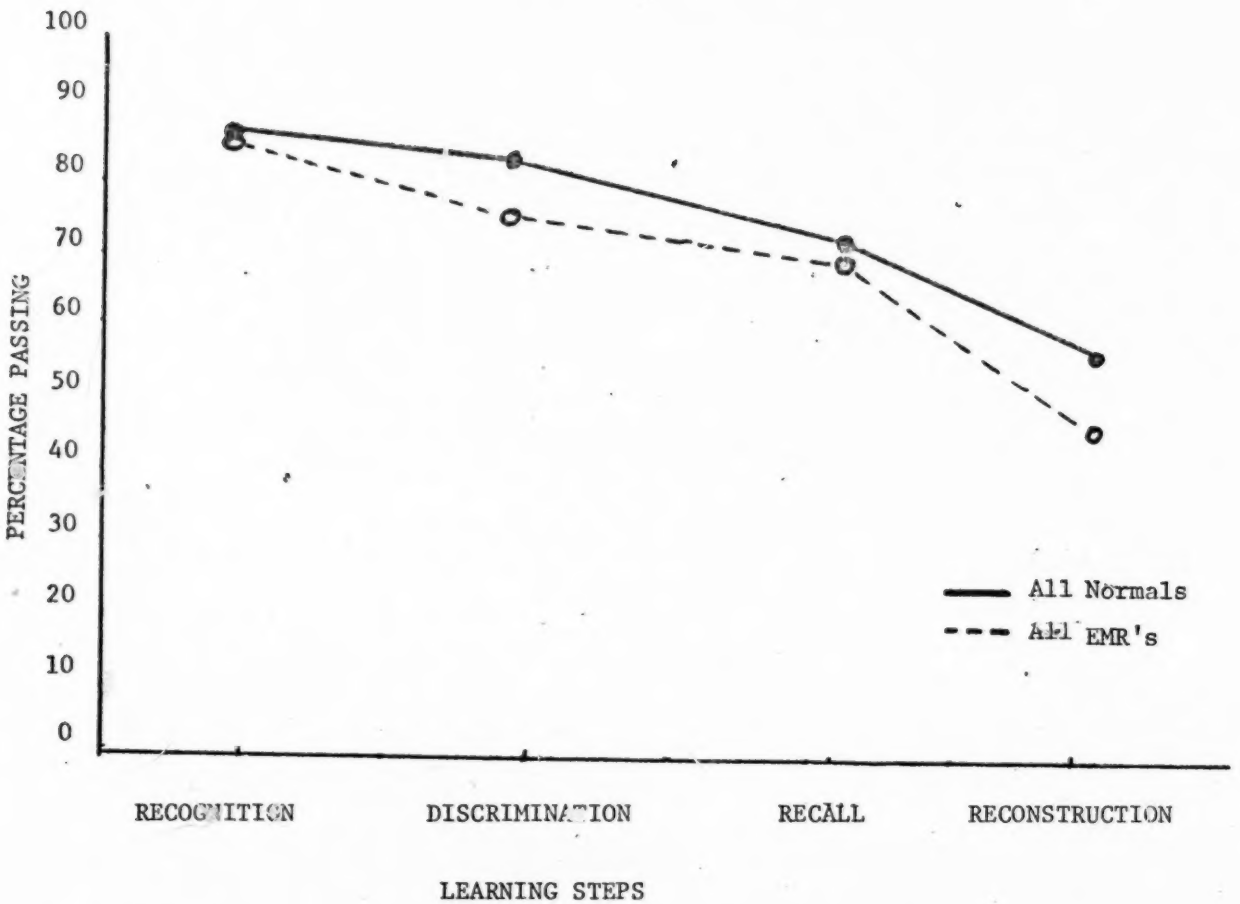
FIGURE 3--Comparison of Dimension Difficulty for Normal and Retarded Subjects.



1.4 The data presented in Figure 4 support the findings with normal children; learning step difficulty increases from recognition through discrimination, recall and reconstruction.

FIGURE 4--Comparison of Learning Step Difficulty for Normal and Retarded Subjects.

Figure 4



2.0 By comparing the percentage of children within each age group who passed each item, the performance of 7-9 year old EMR children was compared item for item with the performance of normal 5 year olds. Similarly, the 5 year old EMR children were compared with the normal 4 year olds, and the 4 year old EMR's compared with the 3 year old normals in an item by item analysis. In general, these comparisons revealed that the scores of the EMR children were very similar to those obtained by the younger normal counterparts. The following exceptions were noted:

2.1 For all EMR subjects, the items which were complex in that they required judgment on a combination of dimensions as well as a motor response (i.e., items 18, 19 and 20; "Put all of the large shapes in the Try-trays", "...all of the medium shapes...", "...small shapes...") were more difficult than for normals. Such items seemed to clearly differentiate the performance of normal and retarded children.

2.2 Items which required fine motor skills as well as perceptual skills (i.e., Item 17--reconstruction of a sequence of colored beads on a string) were more difficult for all age levels of EMR subjects. This difference was particularly pronounced in the younger age group. The lower the age level, the greater difficulty the child had completing the tasks which required motor skills.

2.3 The younger EMR children experienced more difficulty than normals on tasks which required them to sequence objects or figures.

2.4 The preschool EMR children performed better than would have been expected on recall tasks.

DISCUSSION:

1.0 This study has shown that there is clearly a developmental progression in the acquisition of visual perception skills by retarded children. The gap between the performance of retarded and normal subjects on visual perceptual tasks does not appear to diminish as chronological age increases--at least in the groups sampled. The progression of learning step difficulty, from simple recognition through reconstruction, found earlier for normal children, also holds for the EMR sample.

The model for sequencing visual perceptual tasks being explored here holds that tasks involving concrete materials are easier than similar tasks presented via pictures. The data for the normal group supports this assumption; however, a reverse pattern emerged for retarded children at young age levels. The reasons for this difference are not altogether clear; since the results for the older EMR group are in the predicted direction, one might speculate that there were significant experiental and/or behavioral differences between the retarded groups sampled. There is some evidence to support the notion that the younger EMR subjects were drawn from a population where mental retardation is confounded by, or confused with, social deprivation. The primary EMR subjects were not drawn from a disadvantaged population. It is also possible that the preschool program for the young EMR subjects tends to provide extended practice with representational level tasks. The limitations of the data gathered for this study preclude the assumption that EMR children actually acquire visual perceptual skills in a sequence different than that found for normals.

The accelerated performance of retarded subjects over normals on tasks involving the dimension of shape can possibly be explained on the basis of experiential differences between the two groups. Since the advent of "Sesame Street", young children are more exposed to the concept of shape both through television and in the classroom where teachers are more atuned to the "Sesame Street curriculum." The validation with normal children was made during "Sesame Street's" first season.

2.0 The informal item analysis revealed findings which are consistent with the literature on the behavioral manifestations of mental retardation. Where visual perceptual tasks overlapped with higher cognitive processes, the retarded child appeared to find the task relatively more difficult than did the normal child. Poor fine motor skills development inhibited the performance of retarded children or certain types of perceptual tasks.

This factor may partially account for the finding discussed above that younger EMR children performed better on the representational portion of the test than at the concrete level which included more tasks calling for coordinated motor responses. Sequencing deficits are common in both retarded and disadvantaged children, thus the findings here are not unexpected.

The recall tasks were presented in a game-like manner, "Now I'm going to hide one of them....", which appeared to be highly motivating for the young EMR children and undoubtedly enhanced their performance.

SUGGESTIONS FOR TRAINING:

1. Provide simple tasks at young age levels.

2. Present tasks in steps from recognition to reconstruction.

3. Design tasks in such a way that poor motor coordination does not prevent the retarded child from demonstrating his ability to respond to the perceptual demands of the task.

4. Provide early practice with both concrete and representational materials.

5. Capitalize on each child's unique background of visual perceptual input; gradually move to new areas.

6. Use game format for task presentation to heighten novelty effect and increase motivation.

REFERENCES

Langstaff, A. L. and Volkmor, C. B.: Development of a Task Sequence in Visual Perception: A Validation Study. Urbana, Ill: ERIC document number ED 063-035, 1971.